Generator Interconnection Facilities Study

SCE&G V.C. Summer Nuclear #2

Prepared for:
SCE&G Nuclear Group

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Prepared by:
SCE&G Transmission Planning

TABLE OF CONTENTS

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A Generator Interconnection Facilities Study is an extension of the previous Generation Interconnection System Impact Study, and specifies and estimates the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the Interconnection System Impact Study in accordance with Good Utility Practice to physically and electrically connect the Interconnection Facility to the Transmission System. A Generator Interconnection Facilities Study also identifies the electrical switching configuration of the connection equipment, including, without limitation: the transformer, switchgear, meters, and other station equipment; the nature and estimated cost of any Transmission Provider's Interconnection Facilities and Network Upgrades necessary to accomplish the interconnection; and an estimate of the time required to complete the construction and installation of such facilities.

General Discussion

The SCE&G Nuclear Group has applied for interconnection of a new 1375 MVA nuclear generator near the existing V.C. Summer site. This new generator would be jointly owed by SCE&G and Santee Cooper, SCE&G would own 55% and Santee Cooper would own the remaining 45%. In this study Santee Cooper's portion of the generator output was represented as delivered to the Santee Cooper system.

The previously completed System Impact Study recommended the following transmission line improvements:

1. Construct VC Summer-WInnsboro- Killian 230kV
    - (add 230kV terminal at Killian)
2. Construct VC Summer-Lake Murray 230kV
    - (add 230kV terminal at Lake Murray)
3. Construct VC Summer #2-VC Summer #1 bus #2
    - (add 230kV terminal at VC Summer #1 bus #2)
4. Construct VC Summer #2-VC Summer #1 bus #3
    - (add 230kV terminal at VC Summer #1 bus #3)
5. Upgrade existing Denny Terrace-Lyles 230kV
6. Add a 3rd 230/115kV 336 MVA auto transformer at Lake Murray
7. Add a 3rd 230/115kV 336 MVA auto transformer at Denny Terrace
8. Upgrade existing Saluda-McMeekin 115kV line
9. Upgrade existing Lake Murray-McMeekin 115kV line
10. Upgrade existing Lake Murray-Saluda 115kV
11. Add second 230kV bus tie breaker at Denny Terrace

Construct a new 230kV generator substation at the proposed site using a breaker-and-a-half design with ten 230kV terminals

Construct Transmission from VC Summer #2 Generator to VC Summer #2 Switchyard

Re-terminate VC Summer area lines to the VC Summer #2 Substation

1. Re-terminate Bush River (Duke) 230kV line to VC Summer #2 substation
2. Re- terminate Newberry (SCPSA) 230kV line to VC Summer #2 substation (paid by SCPSA)
3. Re-terminate Ward 230kV line to VC Summer #2 substation
4. Re-terminate Lake Murray 230kV #1 line to VC Summer #2 substation
5. Re-terminate Denny Terrace 230kV #1 line to VC Summer #2 substation

Re-terminate VC Summer area lines to the VC Summer #1 Substation

1. Re-terminate Blythewood (SCPSA) 230kV line to VCS bus #1 (paid by SCPSA)
2. Re-terminate Pineland 230kV line to VCS bus #3
3. Re-terminate Denny Terrace 230kV line #2 to VCS bus #3
4. Re-terminate Newport (Duke) 230kV line to VCS bus #2

Replace overstressed

1. 230kV breakers - 9
2. 115kV breakers - 9

In the future, SCE&G Transmission Planning will periodically review the results of this Interconnection Facilities Study to determine if the recommended transmission expansion and the associated cost estimates remain valid.

I. Generator Information

The generator design consists of a single nuclear unit and one step-up transformer. The generator unit will have a maximum gross MVA output capacity of 1,375 MVA and a maximum continuous net MW of 1,165 MW.

The generator design consists of the following information:

MVA – gross:	1375
MW – net:	1165
Power Factor:	between .90 and 1.05
Voltage:	22kV
Speed:	1800 rpm
X'd-sat.: 0.465 PU;	X''d-sat.: 0.325 PU
X2-sat.: 0.320 PU;	X0: 0.237 PU

II. Cost Estimates of Transmission Provider's Interconnection Facilities and Network Upgrades and Completion Dates

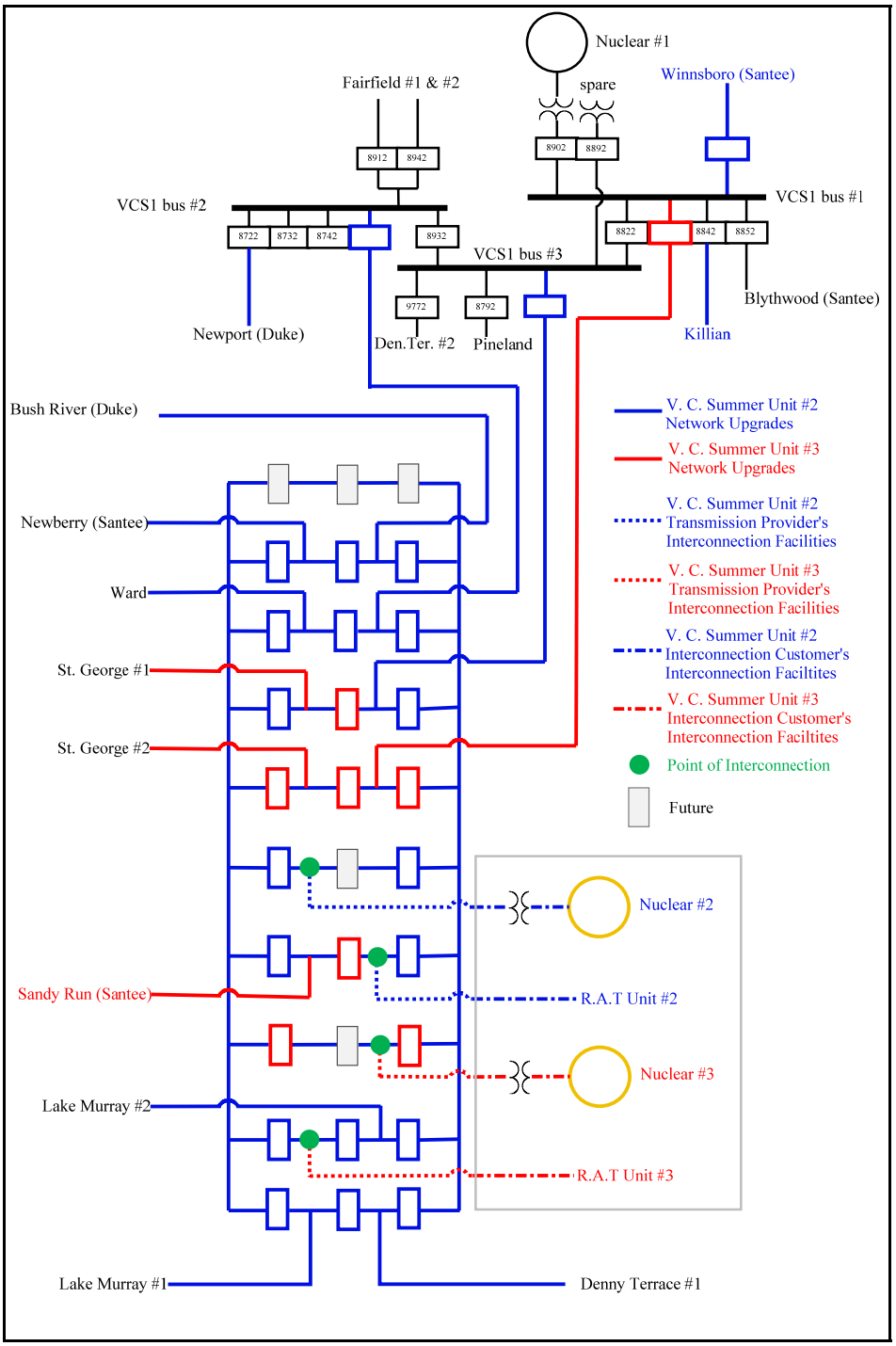
The Table below includes the cost estimate for the required Transmission Provider Interconnection Facilities, the required Network Upgrades and the estimated completion date for each of these required projects.

VC Summer Unit #2 Transmission Cost Estimates
Escalated at 4% per year from 2008

Project Name	Scheduled End Date	Budget 2008	Budget 2009	Budget 2010	Budget 2011	Budget 2012	Budget 2013	Budget 2014	Budget 2015	Budget 2016	Budget 2017	Budget 2018	Totals
Summer Unit #2 230KV Switchyard - Construct	12/31/2013				1,000,000	15,000,000	17,000,000		Budgeted in Nuclear				**33,000,000**
Summer #1-Killian -230KV Line - Construct B1272 (Estimate includes R/W. Assume rebuild of current H-frame for approx approx 24 miles single circuit single shaft – no additional R/W required and a single shaft single circuit for 3 miles. Assume additional R/W of 70ft alongside existing R/W from Pineland to Killian – approx 26 acres @ 80,000 per Acre)	12/31/2015					500,000	1,500,000	14,000,000	19,000,000				**35,000,000**
Killian Add 230KV Term – Summer-Construct	12/31/2015								840,000				**840,000**
VCS #2-Lake Murray Trans #2-230KV Line - Construct (assume rebuild of current H-frame approx 19 miles single circuit single shaft – no additional R/W required)	12/31/2015					800,000	3,000,000	10,000,000	10,000,000				**23,800,000**
Lake Murray Transmission: Add 230KV Term VCS#2	12/31/2015								840,000				**840,000**
Summer Unit #2-230KV Tie to Bus #2 - Construct (Assume 0.75 mile)	12/31/2013						840,000						**840,000**
Summer Unit #1 – Add 230KV Term to Bus #2 - Construct	12/31/2013						840,000						**840,000**
Summer Unit #2-230KV Tie to Bus #3 – Construct (Assume 0.75 mile)	12/31/2013						840,000						**840,000**
Summer Unit #1 – Add 230KV Term to Bus #3 - Construct	12/31/2013						840,000						**840,000**
Denny Terrace-Lyles 230KV – Rebuild to B1272 (Approx 2.75 mile)	12/31/2015							100,000	2,000,000				**2,100,000**
VC Sum Area: Reterminate 230kV lines to VCS #1 Sub	12/31/2013						950,000						**950,000**
VC Sum Area: Reterminate 230kV Lines to VCS #2 Sub	12/31/2013						1,800,000						**1,800,000**
Lake Murray Trans – Add 3rd 336 Autobank	12/31/2015							3,000,000	4,000,000				**7,000,000**
Denny Terrace – Add 3rd 336 Autobank / 230kV BT	12/31/2015							5,000,000	6,000,000				**11,000,000**
Saluda-McMeekin 115KV Line – Upgrade (Approx 0.2 mile)	12/31/2015						200,000						**200,000**
Lake MurrayTrans-McMeekin 115KV Line – Upgrade (Approx 0.6 mile)	12/31/2015								700,000				**700,000**
Lake Murray-Saluda 115KV Line Upgrade (Approx 0.5 mile)	12/31/2015								630,000				**630,000**
Various 115KV PRCB Upgrade Interrupter Rating (Assume 9 PRCBs)	12/31/2015							800,000	3,000,000				**3,800,000**
Various 230KV PRCB Upgrade Interrupter Rating (Assume 9 PRCBs)	12/31/2015							1,300,000	5,000,000				**6,300,000**
VC Summer Unit #2 to Unit #2 Sub 230kV Line: Const	12/31/2013						500,000						**500,000**
VC Summer RAT #2 to Unit #2 Sub 230kV Line: Constr	12/31/2013						500,000						**500,000**
VCS - Parr 115kV Safeguard Line: Raise for Unit 2	12/1/2009		70,000										**70,000**
VC Summer Sub: 230kV BB Bus Tie between #1 & #3	5/1/2009		250,000										**250,000**
		0	**320,000**	**0**	**1,000,000**	**16,300,000**	**28,810,000**	**34,200,000**	**52,010,000**	**0**	**0**	**0**	**132,640,000**

III. Facilities Classifications

The Facilities Study report must identify and estimate the cost of any Transmission Provider's Interconnection Facilities and Network Upgrades necessary to accomplish the interconnection. The diagram below includes color and line style indications of which facilities fall into the classification of Network Upgrades, Transmission Provider's Interconnection Facilities or Interconnection Customer's Interconnection Facilities. Cost estimates for all Network Upgrades and Transmission Provider's Interconnection Facilities are included in Section II of this report. *The diagram below is different from the diagram in the System Impact Study and reflects the most recent substation design.*



IV. Electrical Switching Configuration